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# UTILITY PATENT APPLICATION TRANSMITTAL

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First Inventor or Application Identifier

Greg Linden

Title

AUTOMATICALLY IDENTIFYING SIMILAR  
PURCHASING OPPORTUNITIES

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## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 202311. ☒ Authorization for Extensions & Fee Transmittal  
(Submit an original and a duplicate for fee processing)2. ☒ Specification [Total Pages] **21**  
(preferred arrangement set forth below)

- Descriptive Title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. ☒ Drawing(s) (35 USC 113) [Total Sheets] **4**4. Oath or Declaration [Total Pages] **1**

- a. ☒ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 CFR 1.63(d))  
(for continuation/divisional with Box 16 completed)
- i. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting  
inventor(s) named in the prior application,  
see 37 CFR 1.63(d)(2) and 1.33(b)

\*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO  
PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS  
REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A  
PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. ☐ Microfiche Computer Program (Appendix)6. Nucleotide and/or Amino Acid Sequence Submission  
(if applicable, all necessary)

- a. ☐ Computer-Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))8. ☒ 37 CFR 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney9. ☐ English Translation Document (if applicable)10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations11. ☐ Preliminary Amendment12. ☒ Return Receipt Postcard12. ☐ Small Entity Statement filed in prior application, Status still proper and desired14. ☐ Certified Copy of Priority Document(s)  
(if foreign priority is claimed)15. ☒ Other: Check

16. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary amendment

☐ Continuation ☐ Divisional ☐ Continuation-In-Part (CIP) of prior Application No.: \_\_\_\_\_

Prior application information: Examiner \_\_\_\_\_ Group / Art Unit \_\_\_\_\_

For CONTINUATION or DIVISIONAL apps only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

☐ Claims the benefit of Provisional Application No. \_\_\_\_\_

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REGISTRATION NO. 37,376Date March 30, 2002

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## AUTOMATICALLY IDENTIFYING SIMILAR PURCHASING OPPORTUNITIES

### TECHNICAL FIELD

The present invention is directed to the field of electronic commerce, and,  
5 more particularly, to the field of purchasing opportunity analysis.

### BACKGROUND

Electronic commerce enables computer users to purchase items, such as  
products and services, on the World Wide Web in a variety of ways using their  
computers. For example, opportunities to purchase items online include: online stores  
10 that are analogous to brick and mortar stores selling large inventories of items at a fixed  
price, online classifieds that sell a single item at a fixed price, online auctions in which  
users bid on an item, online reverse auctions in which sellers bid to sell an item to a user,  
and online purchase aggregation, in which groups of users aggregate their orders for  
products.

15 It can be useful for users to be able to identify similar purchasing  
opportunities, such as different opportunities to purchase the same or similar items. In  
the case of one-at-a-time purchasing opportunities such as online classifieds, a user may  
wish to find additional opportunities to purchase the same item where the user needs  
more than one of the item. For all kinds of purchasing opportunities, a user may wish to  
20 (a) price-shop for the same item, or (b) identify similar items that the user might also  
wish to purchase, either as an alternative to the first item or in addition to it.

Unfortunately, purchasing opportunities are generally not well-organized  
with respect to these objectives. Indeed, it is common for purchasing opportunities to be  
organized into general item categories, such as “office supplies” vs. “kitchen  
25 implements.” In some cases, purchasing opportunities are not organized at all.

Accordingly, a technique for automatically identifying opportunities to purchase similar items on the World Wide Web would have significant utility.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a high-level block diagram showing the environment in which the facility preferably operates.

Figure 2 is a display diagram showing a representative window displayed by the facility.

Figure 3 is flow diagram showing the steps preferably performed by the facility in order to score the similarity of other purchasing opportunities to a distinguished purchasing opportunity.

Figure 4 is a data structure diagram showing a purchasing opportunity table preferably used by the facility.

## DETAILED DESCRIPTION

In a preferred embodiment, a software facility for automatically identifying similar purchasing opportunities ("the facility") is provided. For example, for an initial auction, the facility can preferably identify auctions, or purchasing opportunities of other types, that offer the same or a similar item, similar prices or other terms, etc.

The facility preferably uses descriptive information about an initial purchasing opportunity to identify purchasing opportunities that are similar to the initial purchasing opportunity. The descriptive information may include information describing the item offered in the initial purchasing opportunity, as well as information describing other terms of the purchasing opportunity, such as price, availability, seller identity or location, purchasing opportunity type, as well as a variety of other types of information about the initial purchasing opportunity.

The facility first identifies key words occurring in the descriptive information for the initial purchasing opportunity whose occurrence tend to best differentiate the initial purchasing opportunity from others. The facility attributes a score to each key word quantifying this tendency. In a preferred embodiment, the facility

identifies key words and attributes scores using the inverse document frequencies of the terms occurring in the descriptive information for the initial purchasing opportunity. The inverse document frequency of a term measures the fraction of occurrences of the term among the descriptive information for all of the purchasing opportunities that occur in the descriptive information for the initial purchasing opportunity. For example, if a particular term occurred three times in the descriptive information for the initial purchasing opportunity and occurred 100 times in the descriptive information for all of the purchasing opportunities, that term would have an inverse document frequency of 3%, or .03.

The facility searches the descriptive information for all of the purchasing opportunities to determine, for each key word, which purchasing opportunities' descriptive information contains the key word. In one embodiment, the facility does so by conducting a separate search for each key word, producing, for each key word, a search result containing a list of all of the purchasing opportunities whose descriptive information contain the key word. The facility then generates similarity scores for at least some of the other purchasing opportunities by, for each such purchasing opportunity, summing the scores of key words that occur in the purchasing opportunities.

The purchasing opportunity scores may then be used to order the purchasing opportunities based upon their level of similarity to the initial purchasing opportunity. For example, the facility may order other purchasing opportunities in decreasing order of their similarity to the initial purchasing opportunity. The purchasing opportunity scores may also be used to subset the purchasing opportunities based upon their level of similarity to the initial purchasing opportunity. For example, the facility may subset the other purchasing opportunities to include only the 20 purchasing opportunities that are the most similar to the initial purchasing opportunity, or may subset them to include only the purchasing opportunities that are judged to have at least a 90% likelihood of offering the same item that is offered in the initial purchasing opportunity. By displaying such ordered and/or subsetting lists of purchasing opportunities, the facility enables a user to purchase the same item from multiple sources, price-shop for an item among different sellers and/or purchasing opportunity types, or identify similar items that

the user might also wish to purchase, either as an alternative to the first item or in addition to it.

Figure 1 is a high-level block diagram showing the environment in which the facility preferably operates. The block diagram shows several client computer systems, such as client computer systems 110, 120, and 130. Each of the client computer systems has a web client computer program for browsing the World Wide Web, such as web clients 111, 121, and 131. The client computer systems are connected via the Internet 140 to a server computer system 150 hosting the facility. Those skilled in the art will recognize that client computer systems could be connected to the server computer system by networks other than the Internet, however.

The server computer system 150 contains a memory 160. The memory 160 preferably includes auction software 161 incorporating the facility 162, as well as a web server computer program 163 for delivering web pages in response to requests from web clients. While items 161-163 are preferably stored in memory while being used, those skilled in the art will appreciate that these items, or portions of them, may be transferred between memory and a persistent storage device 172 for purposes of memory management and data integrity. The server computer system further contains one or more central processing units (CPU) 171 for executing programs, such as programs 161-163, and a computer-readable medium drive 173 for reading information or installing programs such as the facility from computer-readable media, such as a floppy disk, a CD-ROM, or a DVD.

While preferred embodiments are described in terms in the environment described above, those skilled in the art will appreciate that the facility may be implemented in a variety of other environments including a single, monolithic computer system, as well as various other combinations of computer systems or similar devices connected in various ways.

To more fully illustrate its implementation and operation, the facility is described in conjunction with an example.

Figure 2 is a display diagram showing a representative window displayed by the facility. Window 200 contains descriptive information 210 about a current

auction for Archie and Jughead salt and pepper shakers. Information 210 includes such fields as name, current bid, last bid, opening time, closing time, number of bids, starting bid, amount, accepted payment methods, detailed item description, photo, seller identity, shipping fee, customer service policy, and item category. In additional embodiments, other types of data may be included in information 210. The window further includes controls 221 and 222 for bidding on the current auction. A user can use these controls to bid on the auction by typing a bid amount in bid amount field 221, then clicking on "bid" button 222. The window further includes a "see similar auctions" button 223 for displaying information about auctions for similar items. The user may use this control to display information about similar auctions by clicking on the "see similar auctions" button 223. When the user clicks on button 223, the facility analyzes other auctions to identify similar ones. In additional embodiments, the facility can identify auctions for the same item, or purchasing opportunities of various types for the same item or similar items.

Figure 3 is flow diagram showing the steps preferably performed by the facility in order to score the similarity of other purchasing opportunities to a distinguished purchasing opportunity, such as the auction described by information 210. In step 301, the facility selects terms in the description of the distinguished item or items having the highest inverse document frequencies. In various embodiments, terms are selected from various combinations of fields 210. Steps 302-304 constitute a loop that is repeated for each term selected as a key word in step 301. In step 303, the facility conducts a search for purchasing opportunities whose item descriptions contain the selected term. In step 304, if additional selected terms remain, then the facility continues in step 302 to process the next selected term. Steps 305-308 constitute a loop that is repeated for each purchasing opportunity found in at least one of the searches conducted in step 303. In step 306, the facility determines which selected terms occur in the item description for the purchasing opportunity. In step 307, the facility determines a score for the purchasing opportunity by summing the inverse document frequencies of any of the selected terms that occurred in the item description for the purchasing opportunity. In step 308, if

additional purchasing opportunities remain, then the facility continues in step 305 to process the next purchasing opportunity. After step 308, the steps conclude.

Figure 4 is a data structure diagram showing a purchasing opportunity table preferably used by the facility. Each row in the purchasing opportunity table corresponds to a different purchasing opportunity. As shown, each row in the table contains two fields: a purchasing opportunity identifier field 411 contain an identifier that uniquely identifies the purchasing opportunity of the row, and an item description field 412 that contains a description of the item offered in the purchasing opportunity. For example, in row 401, it can be seen that the Archie and Jughead salt and pepper auction shown in Figure 2 has purchasing opportunity identifier "100976591," and item description "Archie and Jughead ceramic salt and pepper shakers, in original package, perfect condition."

While the descriptive information used by the facility is shown in a single table having only two columns, is shown as corresponding only to the "Detail" field shown in Figure 2, those skilled in the art will appreciate that this information could be distributed across a large number of different tables, or even stored in a completely different form. Such tables may contain additional columns other than those shown in Figure 4 and may be stored in compressed or otherwise optimized form. Further, the descriptive information used by the facility may include additional information associated with each purchasing opportunity in addition to or instead of the contents of the "Detail" field.

In one embodiment, the purchasing opportunity table is derived directly from electronic records of purchasing opportunities managed by the operator of the facility. In an additional embodiment, the purchasing opportunity table is compiled by systematically retrieving and analyzing information describing purchasing opportunities managed by others.

In order to find purchasing opportunities similar to the auction shown in Figure 2, the facility determines the inverse document frequencies of the words, or "terms," occurring in the item description for the auction in Figure 2, which is referred to as the "distinguished purchasing opportunity." The result is shown below in Table 1.



Term From Item Description for Distinguished Purchasing Opportunity	Inverse Document Frequency in Distinguished Item Description
<u>Archie</u>	.04123692
and	.00000421
<u>Jughead</u>	.06523911
<u>ceramic</u>	.00127635
<u>salt</u>	.00915263
<u>pepper</u>	.00897250
<u>shakers</u>	.00904123
in	.00000517
original	.00008216
package	.00005972
perfect	.00004257
condition	.00004924

**TABLE 1**

The facility uses these inverse document frequencies to identify key words among the terms occurring in the item description for the distinguished purchasing opportunity. In various embodiments, the facility (a) selects any terms having an inverse document frequency higher than a fixed threshold; (b) selects a fixed number of the terms having the highest inverse document frequencies; and (c) selects a fixed percentage of the terms having the highest document frequencies. In the example, the facility utilizes an inverse document frequency absolute threshold of .0010000. Accordingly, the facility selects the following terms having inverse document frequencies greater than .0010000 as

key words, as indicated in Table 1 by the underlining of these terms: Archie, Jughead, ceramic, salt, pepper, shakers.

After identifying the terms listed above as key words, the facility searches the purchasing opportunity table for purchasing opportunities whose items descriptions contain one or more of the key words. In this regard, the facility determines that the item descriptions for the purchasing opportunities having the following purchasing opportunity identifiers contain one or more of the key words: 219765112, 342197558, and 919822507.

The facility next generates a score for each of these three purchasing opportunities by summing the inverse document frequencies of any key words occurring in the item description for each purchasing opportunity. The results are shown below in Table 2.

Found Purchasing Opportunity Identifier	Term From Item Description for Found Purchasing Opportunity	Inverse Document Frequency in Distinguished Item Description
219765112	<u>ceramic</u>	<u>.0012735</u> .0012735
342197558	<u>salt</u> <u>pepper</u> <u>shakers</u> <u>Archie</u> <u>Jughead</u>	.00915263 .00897250 .00904123 .04123692 <u>.06523911</u> .13364239
91982507	<u>Archie</u> <u>Jughead</u>	.04123692 <u>.06523911</u> .10647603

TABLE 2

The calculated purchasing opportunity scores may be used in a variety of ways. For example, the purchasing opportunity scores may be used to order a list of the

found purchasing opportunities from most similar to least similar. In such a list, purchasing opportunity 342197558 would be first, purchasing opportunity 919822507 would second, and purchasing opportunity 219765112 would be third.

The purchasing opportunity scores can further be used to subset the found purchasing opportunities in a variety of ways. For example, the purchasing opportunity scores may be used to subset the list of found purchasing opportunities to include only (a) purchasing opportunities whose scores exceed an absolute threshold; (b) a fixed number of purchasing opportunities having the highest scores; or (c) a fixed percentage of the found purchasing opportunities having the highest scores. In terms of the example, to identify a group of similar purchasing opportunities, the facility preferably employs an absolute threshold of .05000000, thereby including purchasing opportunities 342197558 and 919822507 and excluding purchasing opportunity 219765112. In order to identify purchasing opportunities having a high likelihood of offering the same item as the distinguished purchasing opportunity, the facility preferably applies an absolute threshold of .11000000, thereby including purchasing opportunity 919822507 and excluding purchasing opportunities 219765112 and 342197558.

It will be appreciated by those skilled in the art that the above-described facility may be straightforwardly adapted or extended in various ways. For example, the facility may be applied to purchasing opportunities of every conceivable sort. Further, the facility may employ a variety of other approaches to assessing term and purchasing opportunity scores. While the foregoing description makes reference to preferred embodiments, the scope of the invention is defined solely by the claims that follow and the elements recited therein.

## CLAIMS

I claim:

1                   1.     A method in one or more computer systems for identifying auctions  
2 offering the same item, comprising:

3                   displaying information about a first auction, the information including a  
4 description of a first item offered in the first auction;

5                   receiving user input requesting information about other auctions offering  
6 items that are the same as the first item;

7                   determining, for the description of the first item among descriptions of  
8 items offered in a group of auctions including the first auction, the inverse document  
9 frequency of terms occurring within the description of the first item;

10                  selecting a plurality of terms within the description of the first item having  
11 the largest inverse document frequencies;

12                  for each of the selected terms, conducting a search for auctions in the group  
13 whose item descriptions contain the selected term;

14                  for each auction found in at least one of the conducted searches,  
15 determining which of the selected terms occur in the auction's item description;

16                  identifying as an auction offering an item that is the same as the first item  
17 an auction among the found auctions where the sum of the inverse document frequencies  
18 of the selected terms that occur in the item description for the auction exceeds a  
19 threshold; and

20                  displaying information about the identified auction.

1                   2.     A method in a computer system for identifying purchasing  
2 opportunities within a set of purchasing opportunities that are similar to a distinguished  
3 purchasing opportunity, the distinguished purchasing opportunity having descriptive  
4 information associated with it, comprising:

5 for each of a plurality of terms occurring in the descriptive information  
6 associated with the distinguished purchasing opportunity, generating a term score  
7 reflecting the extent to which the occurrence of the term in the descriptive information  
8 associated with the distinguished purchasing opportunity differentiates the distinguished  
9 purchasing opportunity from other purchasing opportunities in the set;

10 selecting as key words a plurality of terms having the highest term scores;  
11 identifying purchasing opportunities of the set containing key words; and  
12 establishing a purchasing opportunity score for each identified purchasing  
13 opportunity by summing the term score of the key words occurring in descriptive  
14 information associated with the identified purchasing opportunities.

1 3. The method of claim 2 wherein generating a term score for each term  
2 includes determining the fraction of occurrences of the term in descriptive information  
3 associated with the purchasing opportunities of the set that occur in the descriptive  
4 information associated with the distinguished purchasing opportunity.

1 4. The method of claim 2 wherein identifying purchasing opportunities  
2 of the set containing key words includes performing a separate search for purchasing  
3 opportunities whose descriptive information includes each key word to produce a search  
4 result.

1 5. The method of claim 4, further comprising determining which key  
2 words occur in the descriptive information associated with each purchasing opportunities  
3 based upon which of the produced search results contain the purchasing opportunity.

1 6. The method of claim 2 wherein the distinguished purchasing  
2 opportunity and at least a subset of the purchasing opportunities of the set are of one or  
3 more purchasing opportunity types selected from the group consisting of:

4 store;

5 classified sale;

6 auction;  
7 reverse auction; and  
8 purchase aggregation.

1 7. The method of claim 2, further comprising selecting the  
2 distinguished purchasing opportunity in response to a user request to display information  
3 about the distinguished purchasing opportunity.

1 8. The method of claim 2, further comprising selecting the  
2 distinguished purchasing opportunity in response to the exercise of the distinguished  
3 purchasing opportunity by a selected user.

1 9. The method of claim 8, further comprising selecting the  
2 distinguished purchasing opportunity in response to the purchase by the selected user of  
3 an item offered in the distinguished purchasing opportunity.

1 10. The method of claim 8, further comprising selecting the  
2 distinguished purchasing opportunity in response to a bid by the selected user on an item  
3 offered in the distinguished purchasing opportunity.

1 11. The method of claim 2, further comprising, in response to a user  
2 request for information about a purchasing opportunity similar to the distinguished  
3 purchasing opportunity, displaying information about the identified purchasing  
4 opportunity having the largest purchasing opportunity score.

1 12. The method of claim 2, further comprising, in response to a user  
2 request for information about the distinguished purchasing opportunity, displaying  
3 information about the identified purchasing opportunity having the largest purchasing  
4 opportunity score in conjunction with displaying information about the distinguished  
5 purchasing opportunity.

1           13. The method of claim 2, further comprising displaying at least a  
2 portion of the identified purchasing opportunities in the order of their purchasing  
3 opportunity scores.

1           14. The method of claim 2, further comprising displaying a proper  
2 subset of the identified purchasing opportunities whose purchasing opportunity scores  
3 each exceed a minimum threshold.

1           15. The method of claim 14 wherein the displaying displays a  
2 predetermined fixed number of the identified purchasing opportunities.

1           16. The method of claim 14 wherein the displaying displays all of the  
2 identified purchasing opportunities whose purchasing opportunity scores each exceed the  
3 minimum threshold.

1           17. The method of claim 2 wherein a predetermined fixed number of key  
2 words are selected.

1           18. The method of claim 2 wherein a number of terms that is a  
2 predetermined fraction of the number of terms occurring in the descriptive information  
3 associated with the distinguished purchasing opportunity are selected as key words.

1           19. The method of claim 2 wherein all of the terms whose term scores  
2 exceed a minimum threshold are selected as key words.

1           20. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes the purchasing  
3 opportunity type of the distinguished purchasing opportunity.

1           21. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes an item name of an  
3 item offered in the distinguished purchasing opportunity.

1           22. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes an item description of  
3 an item offered in the distinguished purchasing opportunity.

1           23. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes a price at which an  
3 item is offered in the distinguished purchasing opportunity.

1           24. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes a seller identity of the  
3 distinguished purchasing opportunity.

1           25. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes a seller location of the  
3 distinguished purchasing opportunity.

1           26. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes availability of an item  
3 offered in the distinguished purchasing opportunity.

1           27. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes shipping terms for an  
3 item offered in the distinguished purchasing opportunity.



1           28. The method of claim 2 wherein the descriptive information  
2 associated with the distinguished purchasing opportunity includes forms of payment  
3 accepted for the distinguished purchasing opportunity.

1           29. The method of claim 2 wherein distinguished purchasing opportunity  
2 is an auction, and wherein the descriptive information associated with the distinguished  
3 purchasing opportunity includes the closing date of the auction.

1           30. The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes a publisher  
4 of the distinguished item.

1           31. The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes an author  
4 of the distinguished item.

1           32. The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes an artist of  
4 the distinguished item.

1           33. The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes a  
4 performer of the distinguished item.

1           34.    The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes a size of  
4 the distinguished item.

1           35.    The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes a color of  
4 the distinguished item.

1           36.    The method of claim 2 wherein a distinguished item is offered for  
2 purchase in the distinguished purchasing opportunity, and wherein the descriptive  
3 information associated with the distinguished purchasing opportunity includes a style of  
4 the distinguished item.

1           37.    A computer-readable medium whose contents cause a computer  
2 system to identify purchasing opportunities within a set of purchasing opportunities that  
3 are similar to a distinguished purchasing opportunity, the distinguished purchasing  
4 opportunity having descriptive information associated with it, by:

5               for each of a plurality of terms occurring in the descriptive information  
6 associated with the distinguished purchasing opportunity, generating a term score  
7 reflecting the extent to which the occurrence of the term in the descriptive information  
8 associated with the distinguished purchasing opportunity differentiates the distinguished  
9 purchasing opportunity from other purchasing opportunity in the set;

10              selecting as key words a plurality of terms having the highest term scores;

11              identifying purchasing opportunities of the set containing key words; and

12              establishing a purchasing opportunity score for each identified purchasing  
13 opportunity by summing the term score of the key words occurring in information  
14 associated with the identified purchasing opportunities.

1           38. The computer-readable medium of claim 37 wherein generating a  
2 term score for each term includes determining the fraction of occurrences of the term in  
3 information associated with the purchasing opportunities of the set that occur in the  
4 information associated with the distinguished purchasing opportunity.

1           39. The computer-readable medium of claim 37 wherein the contents of  
2 the computer-readable medium further cause the computer system to display at least a  
3 portion of the identified purchasing opportunities in the order of their purchasing  
4 opportunity scores.

1           40. The computer-readable medium of claim 37 wherein the contents of  
2 the computer-readable medium further cause the computer system to display a proper  
3 subset of the identified purchasing opportunities whose purchasing opportunity scores  
4 each exceed a minimum threshold.

1           41. A data processing system for scoring purchasing opportunities within  
2 a set of purchasing opportunities in terms of their similarity to a distinguished purchasing  
3 opportunity, the distinguished purchasing opportunity having descriptive information  
4 associated with it, comprising:

5           a term score generator that, for each of a plurality of terms occurring in the  
6 descriptive information associated with the distinguished purchasing opportunity,  
7 generates a term score reflecting the extent to which the occurrence of the term in the  
8 descriptive information associated with the distinguished purchasing opportunity  
9 differentiates the distinguished purchasing opportunity from other purchasing opportunity  
10 in the set;

11           a key word selection subsystem that selects as key words a plurality of  
12 terms having the highest term scores;

13           a purchasing opportunity identification subsystem that identifies purchasing  
14 opportunities of the set containing key words; and

15 a purchasing opportunity score that establishes a purchasing opportunity  
16 score for each identified purchasing opportunity by summing the term score of the key  
17 words occurring in information associated with the identified purchasing opportunities.

1 42. A method in a computer system for identifying documents in a set of  
2 documents relevant to a distinguished document, comprising:  
3 identifying key words within the distinguished document; and  
4 ranking documents of the set based upon which of the identified key words  
5 they contain.

1 43. The method of claim 42 further comprising performing a separate  
2 search for each of the identified keywords.

1 44. The method of claim 42 wherein the ranking is further based upon,  
2 for each key word, the fraction of occurrences of the key word in the set of documents  
3 that occur in the distinguished document.

1 45. The method of claim 42 wherein the identifying identifies words  
2 within the distinguished documents that occur with the highest frequencies in the  
3 distinguished document relative to the frequencies with which they occur in the set of  
4 documents as a whole.

1 46. The method of claim 42 wherein the distinguished and ranked  
2 elements each describe a purchasing opportunity

1 47. The method of claim 42 wherein the distinguished and ranked  
2 documents each describe an online auction.

1 48. A computer-readable medium whose contents cause a computer  
2 system to identify documents in a set of documents relevant to a distinguished document,  
3 by:

identifying key words within the distinguished document; and  
ranking documents of the set based upon which of the identified key words  
they contain.

49. The computer-readable medium of claim 48 wherein the contents of  
the computer-readable medium further cause the computer system to perform a separate  
search for each of the identified keywords.

50. The computer-readable medium of claim 48 wherein the ranking is  
further based upon, for each key word, the fraction of occurrences of the key word in the  
set of documents that occur in the distinguished document.

51. The computer-readable medium of claim 48 wherein the identifying  
identifies words within the distinguished documents that occur with the highest  
frequencies in the distinguished document relative to the frequencies with which they  
occur in the set of documents as a whole.

52. The computer-readable medium of claim 48 wherein the  
distinguished and ranked documents each describe a purchasing opportunity.

53. The computer-readable medium of claim 48 wherein the  
distinguished and ranked documents each describe an online auction.

54. A computer memory containing a purchasing opportunity ranking  
data structure, comprising a plurality entries, each entry comprising an indication of a  
purchasing opportunity and an indication of a purchasing opportunity score indicating a  
level of similarity between the purchasing opportunity and a selected purchasing  
opportunity.



AUTOMATICALLY IDENTIFYING SIMILAR  
PURCHASING OPPORTUNITIES

ABSTRACT

A facility for identifying purchasing opportunities within a set of purchasing opportunities that are similar to a distinguished purchasing opportunity is described. The distinguished purchasing opportunity has descriptive information associated with it. For each of several terms occurring in this descriptive information, the facility generates a term score. Each term score reflects the extent to which the occurrence of the term and the descriptive information associated with the distinguished purchasing opportunity differentiates the distinguished purchasing opportunity from auto purchasing opportunities in the set. The facility then selects as key words the terms occurring in the descriptive information associated with the distinguished purchasing opportunity that have the highest term scores. The facility identifies purchasing opportunities of the set containing the selected key words, and establishes a purchasing opportunity score for each identified purchasing opportunity by summing the term score of the key words occurring in information associated with the identified purchasing opportunities.

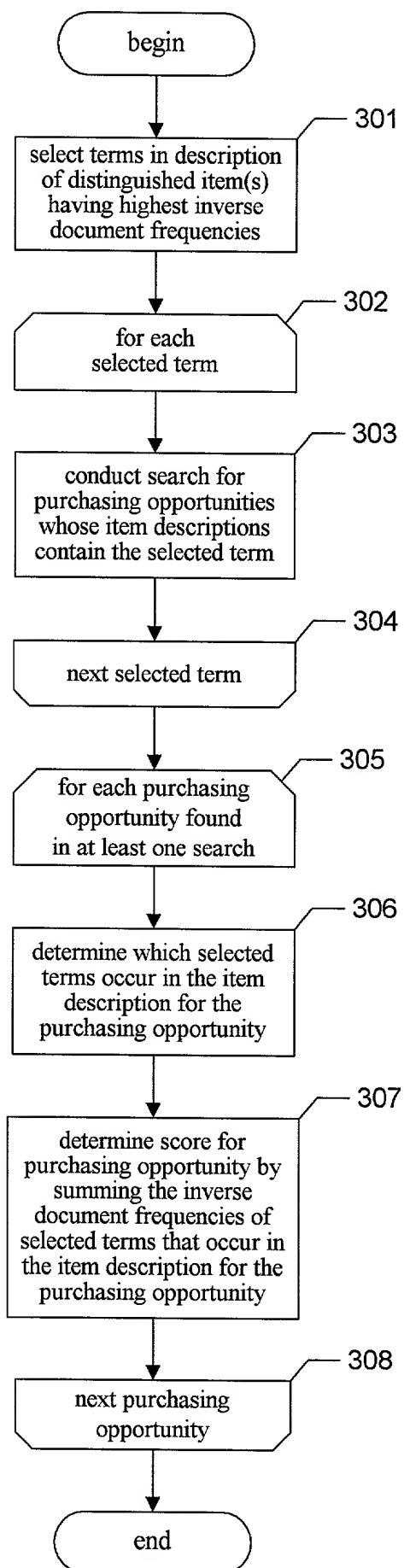




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Table 1. Demographic characteristics of the study population	
Age (years)	65.0 ± 1.5
Gender (male/female)	10/10
Education (years)	12.0 ± 1.0
Occupation (white/blue)	10/10
Marital status (married/divorced/widowed)	10/10/0
Smoking status (smoker/nonsmoker)	10/10
Alcohol consumption (yes/no)	10/10
Comorbidities (hypertension/diabetes/cholesterol)	10/10/10
Medication (antihypertensive/antidiabetic/anticholesterol)	10/10/10
Physical activity (sedentary/active)	10/10
Stress level (low/moderate/high)	10/10/10
Quality of life (SF-36)	50.0 ± 10.0
Health status (good/fair/poor)	10/10/10
Family size (1/2/3/4/5/6/7/8/9/10)	10/10/10/10/10/10/10/10/10/10
Income level (low/medium/high)	10/10/10
Religious beliefs (Christian/Jewish/Muslim)	10/10/10
Language spoken (English/Spanish/Portuguese)	10/10/10
Health insurance (Medicare/Medicaid/Other)	10/10/10
Healthcare utilization (primary care/specialty care)	10/10
Healthcare satisfaction (satisfied/dissatisfied)	10/10
Healthcare access (easy/difficult)	10/10
Healthcare quality (good/poor)	10/10
Healthcare cost (low/high)	10/10
Healthcare coverage (full/partial)	10/10
Healthcare utilization (preventive care/curative care)	10/10
Healthcare satisfaction (preventive care/curative care)	10/10
Healthcare access (preventive care/curative care)	10/10
Healthcare quality (preventive care/curative care)	10/10
Healthcare cost (preventive care/curative care)	10/10
Healthcare coverage (preventive care/curative care)	10/10
Healthcare utilization (preventive care/curative care)	10/10
Healthcare satisfaction (preventive care/curative care)	10/10
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Healthcare quality (preventive care/curative care)	10/10
Healthcare cost (preventive care/curative care)	10/10
Healthcare coverage (preventive care/curative care)	10/10
Healthcare utilization (preventive care/curative care)	10/10
Healthcare satisfaction (preventive care/curative care	



**Fig. 3**

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purchasing opportunity table	
411 Purchasing Opportunity Identifier	412 Item Description
401 100976591	<u>Archie and Jughead</u> ceramic salt and pepper shakers, in original package, perfect condition
402 210765112	<u>ceramic</u> electrical insulator knobs
403 263018453	Black and Decker 10 inch circular saw
• • •	
404 342108558	<u>salt and pepper</u> <u>shakers</u> in form of <u>Archie and Jughead</u> -- eat with your Midvale friends!
• • •	
405 919822507	<u>Archie and Jughead</u> golf club head covers

**Fig. 4**

## DECLARATION

As the below-named inventor, I declare that:

My residence, post office address, and citizenship are as stated below under my name.

I believe I am the original, first, and sole inventor of the subject matter claimed and for which a patent is sought on the invention entitled "AUTOMATICALLY IDENTIFYING SIMILAR PURCHASING OPPORTUNITIES" in the foregoing specification and claims.

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge my duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. § 1.56(a).

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that the making of willfully false statements and the like is punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and may jeopardize the validity of any patent issuing from this patent application.



\_\_\_\_\_  
Greg Linden

Date 3/23/00

Residence : City of Seattle  
State of Washington  
Citizenship : United States of America  
P.O. Address : 8045 36<sup>th</sup> Avenue NE  
Seattle, Washington 98115

PATENT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Greg Linden  
For : AUTOMATICALLY IDENTIFYING SIMILAR  
PURCHASING OPPORTUNITIES

Docket No. : 249768021US

Assistant Commissioner for Patents  
Washington, DC 20231

ELECTION UNDER 37 C.F.R. §§ 3.71 AND 3.73

AND POWER OF ATTORNEY

Sir:

The undersigned, being Assignee of the entire interest in the above-identified application by virtue of an Assignment filed concurrently herewith, a copy of which is enclosed, hereby elects under 37 C.F.R. § 3.71, to prosecute the application to the exclusion of the inventors.

Assignee hereby appoints JERRY A. RIEDINGER, Registration No. 30,582; MAURICE J. PIRIO, Registration No. 33,273; JOHN C. STEWART, Registration No. 40,188; MICHAEL D. BROADDUS, Registration No. 41,637; BRIAN P. MCQUILLEN, Registration No. 41,989; TARANEH MAGHAME, Registration No. 43,768; CATHERINE HONG TRAN, Registration No. 43,960; ROBERT G. WOOLSTON, Registration No. 37,263; PAUL T. PARKER, Registration No. 38,264; JOHN M. WECHKIN, Registration No. 42,216; BRIAN G. BODINE, Registration No. 40,520; CHRISTOPHER DALEY-WATSON, Registration No. 34,807; STEVEN D. LAWRENZ, Registration No. 37,376; JAMES A.D. WHITE, Registration No. 43,985; and FRANK ABRAMONTE, Registration No. 38,066, as the principal attorneys with full power of substitution, association, and revocation to prosecute said application, to transact all business in the Patent and Trademark Office connected

